

**REMARKS**

Claims 1-13 currently appear in this application. The Office Action of July 26, 2006, has been carefully studied. These claims define novel and unobvious subject matter under Sections 102 and 103 of 35 U.S.C., and therefore should be allowed. Applicant respectfully requests favorable reconsideration, entry of the present amendment, and formal allowance of the claims.

**Rejections under 35 U.S.C. 112**

Claims 1, 3, and 5-13 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

This rejection is respectfully traversed.

Claim 1 has been amended to clarify the method of producing xanthohumol-concentrated hop extract. As recited in claim 1 as amended, the xanthohumol-concentrated hop extract to be produced is extracted from a xanthohumol-containing hop raw material by means of supercritical CO<sub>2</sub> under conditions of elevated pressure above 500 bar, and elevated temperatures above 60°C. It is respectfully submitted that there is now proper antecedent basis in claim 1.

Claim 3 has been amended to recite the meaning of "usual supercritical." As disclosed in the specification as filed at page 4, lines 24-26, "usual" supercritical CO<sub>2</sub> used for extraction in the prior art is at a pressure of 200-300 bar and a temperature of 40-60°C. It should be noted that Erdelmeier et al. and Babish et al., cited by the Examiner, disclose extraction processes using supercritical CO<sub>2</sub>; Erdelmeier at paragraphs 0040, 0042 and 0044, and Babish at paragraph 0010.

The term "pre-extracted" means that the hop pellets are extracted in a first extraction step, which is followed by a subsequent extraction with CO<sub>2</sub> under the conditions claimed herein, namely, 600 to 1000 bar, 60 to 90°C. The term "pre-extracted" is conventionally used in multi-stage extraction, as evidenced by Erdelmeier at paragraph 0046.

Claims 5 and 6 have been amended to recite that the dissolved ingredients "are separated."

Claim 7 has been amended to recite positive steps and to clarify what is being extracted and separated. In claim 7 as amended, the first step of extracting hop pellets is the preferred embodiment of the method of claim 1, using hop pellets as hop raw material and extracting the hop pellets at 600-900 bar. This step produces a pre-extract, including a xanthohumol-concentrated extract.

"Pre-extract" in claim 7 is an extract containing the xanthohumol-containing hop extract of claim 1. This pre-extract is treated at pressures of 200-500 bar and temperatures of 40-90°C to separate a xanthohumol-concentrated extract from the pre-extract.

Claim 8 has been amended to clarify that the xanthohumol-concentrated extract is dry and is free from additives.

Claims 9-13 have been amended to clarify the methods claimed.

#### **Rejections under 35 U.S.C. 101**

Claims 9-13 are rejected under 35 U.S.C. 101 because the claimed recitation of a use, without setting forth any steps involved in the process, is said to result in an improper definition of a process.

This rejection is respectfully traversed. Claims 9-13 have been amended to recite positive steps.

#### **Art Rejections**

Claims 1, 2 and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Kuhrts, U.S. Published Application 2003/0228369.

This rejection is respectfully traversed. Kuhrts does not refer to a method for producing a xanthohumol-

concentrated hop extract, but merely a process for converting high-viscosity fluids and compositions thereof. In this connection, Kuhrts merely discloses that, amongst others, high-viscosity fluids may be produced by supercritical CO<sub>2</sub> extraction (see paragraphs 0027 and 0043). This supercritical fluid extraction may be applied to the extraction of hops to separate primary alpha acids, like xanthohumols (see paragraphs 0045, 0047). However, Kuhrts is silent with respect to the conditions which are "supercritical."

The Wikipedia reference adds nothing to Kuhrts, because this is merely a carbon dioxide pressure-temperature phase diagram showing the supercritical fluid region and the so-called critical point of temperature and pressure. However, this is silent with respect to the actual conditions existing during the supercritical fluid extraction claimed herein.

It should be noted that the claims are directed to a method for treating a xanthohumol-containing hop raw material that is subjected to supercritical fluid extraction by highly compressed CO<sub>2</sub> as a solvent at pressures above 500 bar and temperatures above 60°C. As is discussed in the specification as filed at page 4, line 1 to page 5, line 22, heretofore the use of supercritical CO<sub>2</sub> for xanthohumol extraction has been found to be inept. The present inventors have discovered that

extraction pressures of 600 to 1000 bar actually dissolve xanthohumol.

Kuhrts does not disclose any pressure or temperature values for supercritical extraction. Therefore, there is no way that Kuhrts could be said to anticipate the present invention.

Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhrts in view of Erdelmeier et al., U.S. Published Application 2005/0042318, and Babish et al., U.S. Published application 2003/01132393.

This rejection is respectfully traversed. As noted above and as conceded by the Examiner, Kuhrts is silent with respect to the particular conditions of supercritical extraction. Erdelmeier and Babish merely confirm the statements made in the present specification, namely, that conventional supercritical conditions for CO<sub>2</sub> extraction are approximately 200 to 300 bar and 40 to 60°C (see specification as filed page 4, lines 25 and 26). In fact, Erdelmeier et al. discloses producing a hop extract using supercritical CO<sub>2</sub> at 250 bar and 50°C in examples 1a, 1b and 2, paragraphs 0040, 0042 and 0044.

Babish discloses that supercritical extraction is conducted at a pressure of 300 bar and a temperature of 60°C (see paragraph 0010).

It is clear that none of the cited references discloses or suggests a supercritical extraction of hop to obtain xanthohumol using the extreme conditions claimed herein. There is nothing in any of the cited references that would cause one skilled in the art to vary the pressure and/or temperature of CO<sub>2</sub> extraction. As noted in the specification at page 4, lines 11-19, German patent No. 21 27 618, which discloses production of hop extracts, found no improved extraction properties at pressures above 300 to 500 bar. Thus, one skilled in the art would have no motivation to increase both the temperature and pressure of the CO<sub>2</sub>.

Claims 9-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kuhrts in view of Ohnogi et al, U.S. Published Application 2004/0002423.

This rejection is respectfully traversed. Although Kuhrts discloses producing powders from high viscosity liquids, Kuhrts is completely silent about obtaining the xanthohumol compositions obtained by the presently claimed method. Ohnogi adds nothing to Kuhrts, because Ohnogi discloses adding an ethanol extract derived from hops. This ethanol extract is not the same as the xanthohumol extract obtained herein. The specification at page 3, lines 4-9, states that ethanol extraction of hop extract produces xanthohumol along with other hop tannins, so that the extract

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retains clouding tendencies. The extract produced by the  
herein claimed method, however, is free from clouding  
polyphenols (page 5, lines 2-7).

In view of the above, it is respectfully submitted  
that the claims are now in condition for allowance, and  
favorable action thereon is earnestly solicited.

Respectfully submitted,

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